Traffic management for Motorcycle dependent cities:

Lessons learned from Hanoi

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- General Introduction
- Hanoi transport development from the past
- Current issues and challenges
- Traffic Management solutions for MDCs
- Conclusions and recommendation

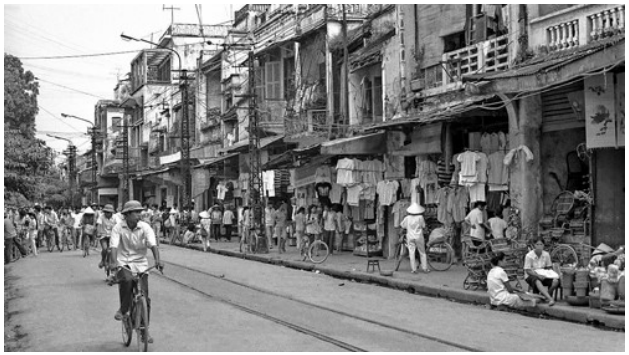
Motorcycle dependent city: Definition

MDC is an urban area, where MC is the main transportation mode, and the urbanization process is influenced by MC usage

- ❖ Critical traffic congestion
- ❖ Serious pollution status
- ❖ Traffic accidents in emergency situation

Hanoi transport: an overview of history

1901 non-motorized transport



1950 -1980 Public transport & Bicycles

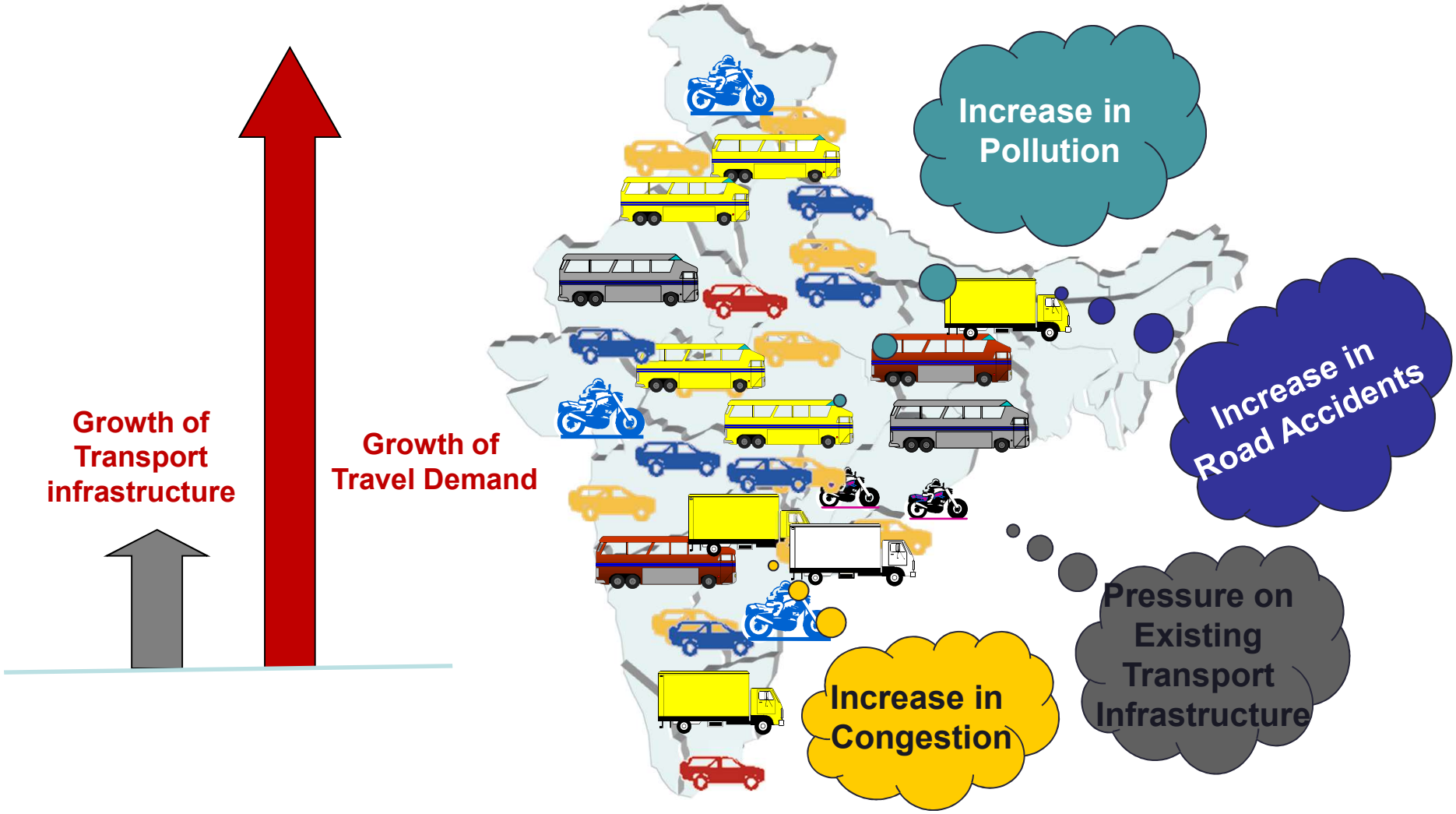
1990s Bicycle and Motorcycles

2005 Motorcycle & others

2010 Motorcycles & Other

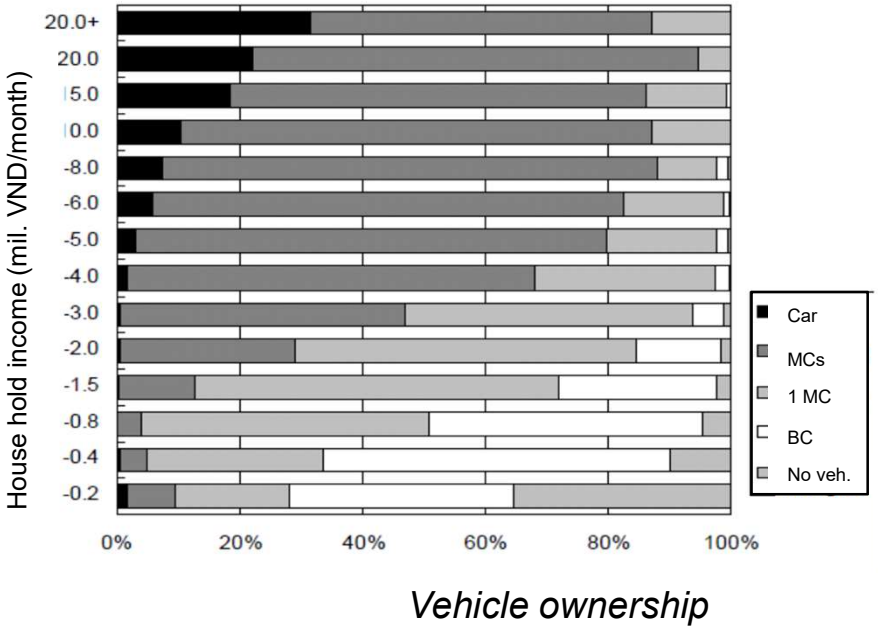
Today: Cars & Motorcycles

MDC: Demand- Supply unbalance



MDCs: Problems and Issues

- ✓ Insufficient road traffic infrastructure and traffic safety facility
- ✓ Public Transportation at low level, inappropriate
- ✓Mixed and tangled traffic of cars, MCs, BCs and pedestrians



Vehicle ownership

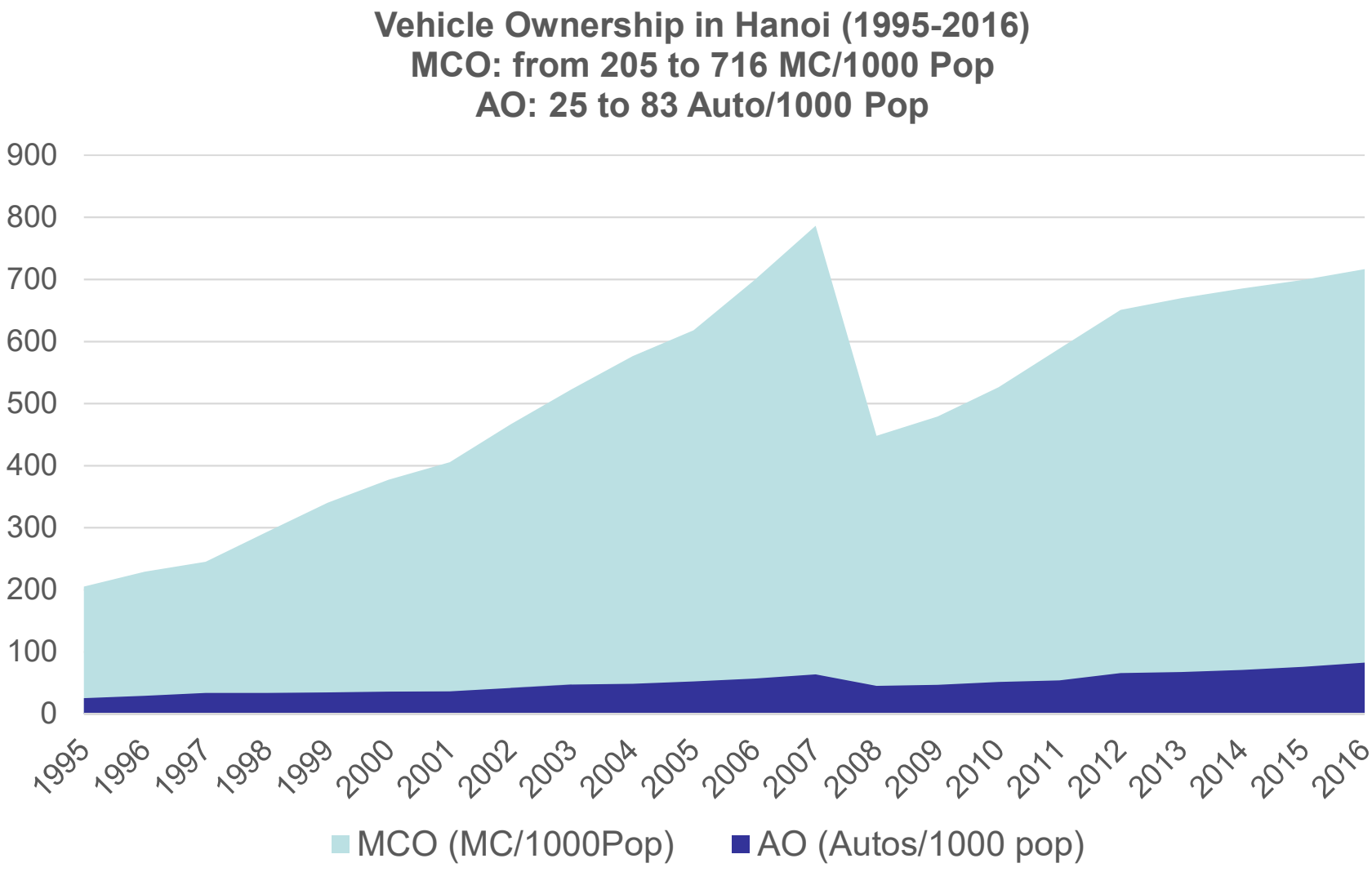
> 50% people living in two-wheeler accessed only blocks

- ✓ Poor accessibility and mobility
- ✓ High motorcycle ownership increase
- ✓ Lack of people's safety awareness and knowledge
- ✓ Disregard of traffic rule
- ✓ Lack of safety and efficient driving manner

Current situation: A motorcycle dependent transport system

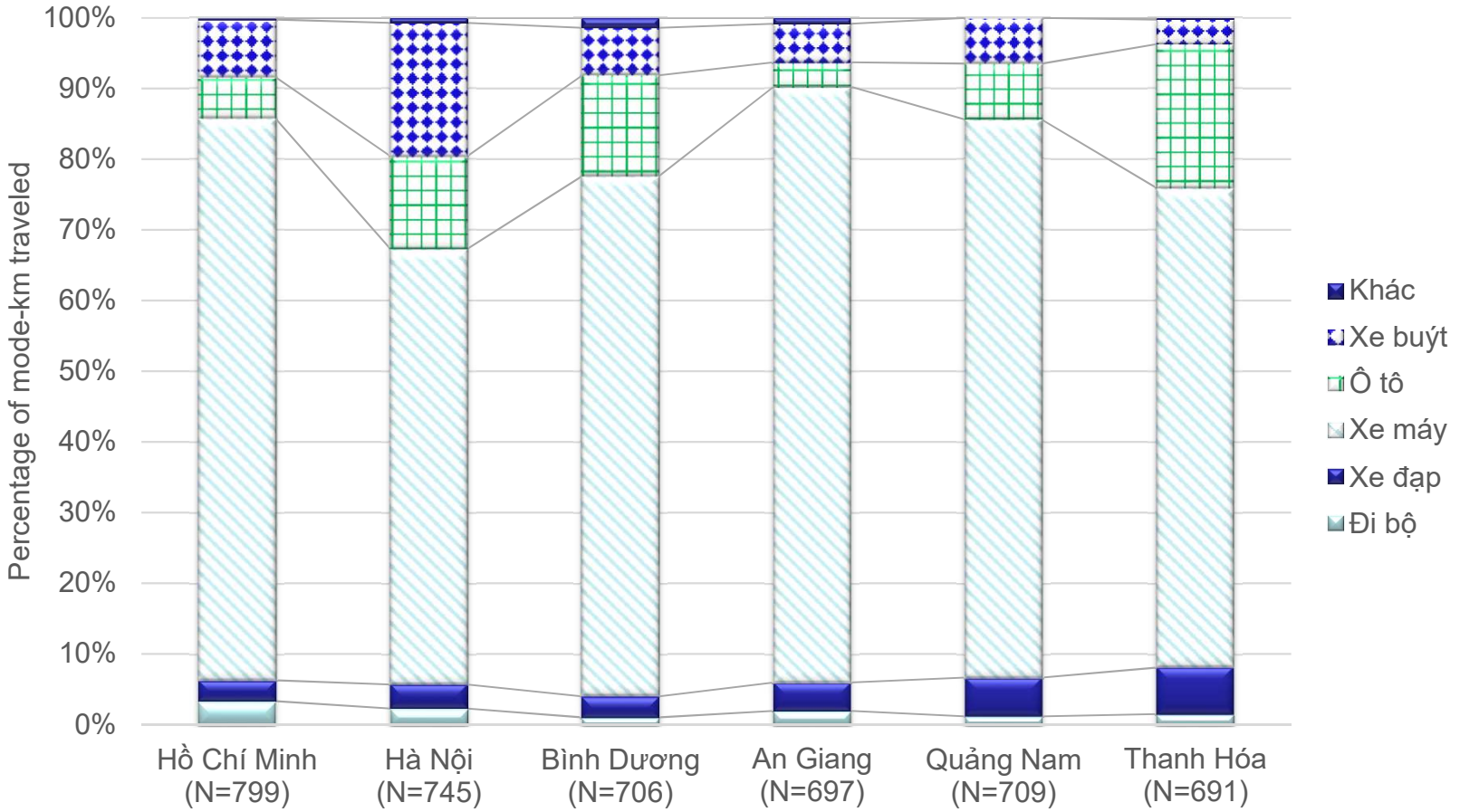
		Hanoi	Sydney	London	Singapore
Population (mil.)		7.0	4.6	7.8	5.1
Area (km^2)		3,345	1,580	1,580	712
Density (pers./ha)		21	29	49	72
Public Transport Rate		11%	14%	40%	57%
Veh./ head	Auto	0.04	0.58	0.31	0.12
	Moto	0.61	na	na	na

Current situation: A motorcycle dependent transport system



(NTSC, 2018)

Current situation: A motorcycle dependent transport system

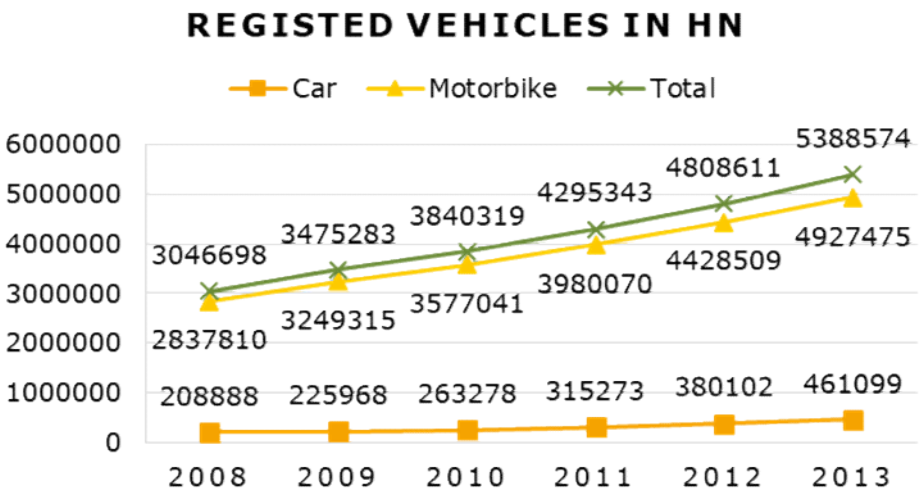


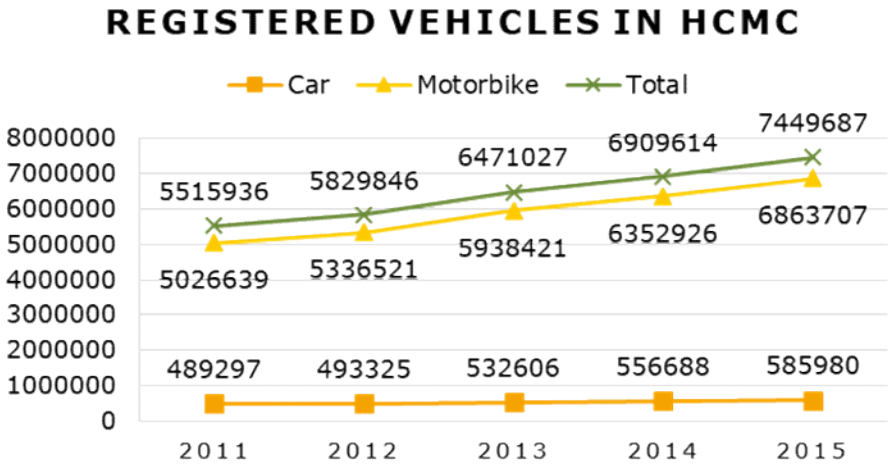
(Vu A.T., 2018)

- An average Hanoian makes 4.2 trip per day = 20 km per day
- About 60% of total travelled distance made by motorcycles.

Increasing fleet of vehicles

- The number of private vehicles increase rapidly in HN and HCMC
  - The number of private vehicle increase average 6 - 7%/year
  - The number is predicted to increase continuously due to the urbanization
  - Traffic congestion increase significantly (if no effective solution taken, in 2020 the traffic congestion in HN will happen at every time and every location in the city (MOT,2016))





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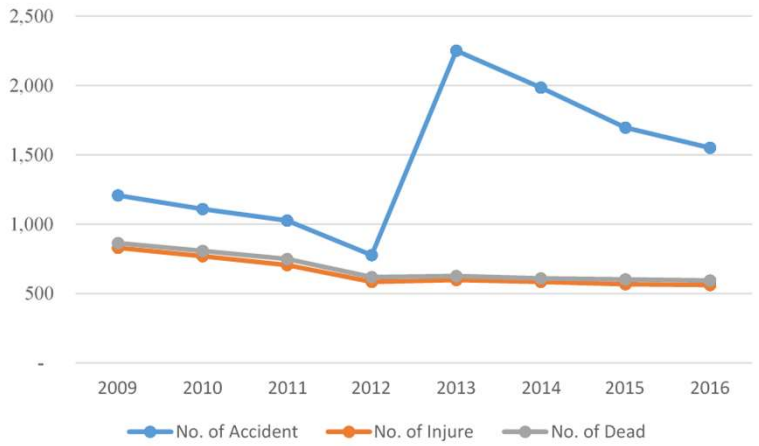
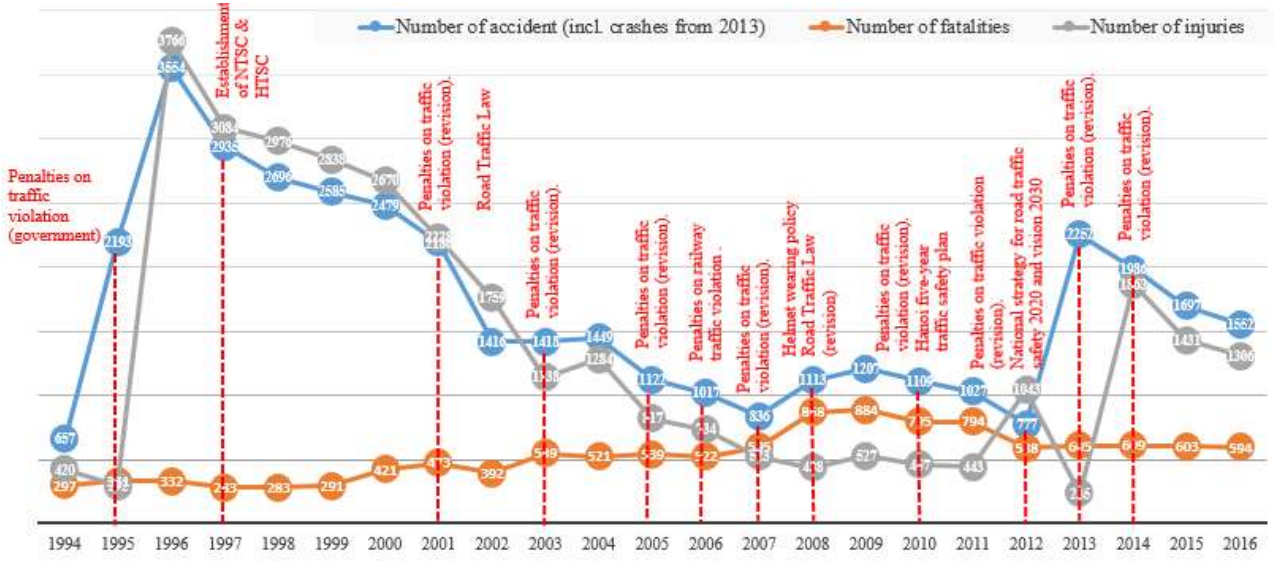
Urban Transport Problems

- ***Accidents***
  - High rate of fatalities
  - Occurred mainly on the urban arterials and sub-urban highways
  - Severe accidents occurred frequently during night time and off-peak period
- ***Congestion***
  - Extremely high volume
  - Unreasonable travel time and speed
- ***Pollution***
  - **Noise:** the most serious environmental problem of motorcyle usage
  - **Air pollution:** high rate of NO_x, CO, CO_x, PM, PM_{10},…

Current situation: Traffic accident



Source: Hanoi Traffic Safety Committee (HTSC), 2017



Traffic Safety Policy

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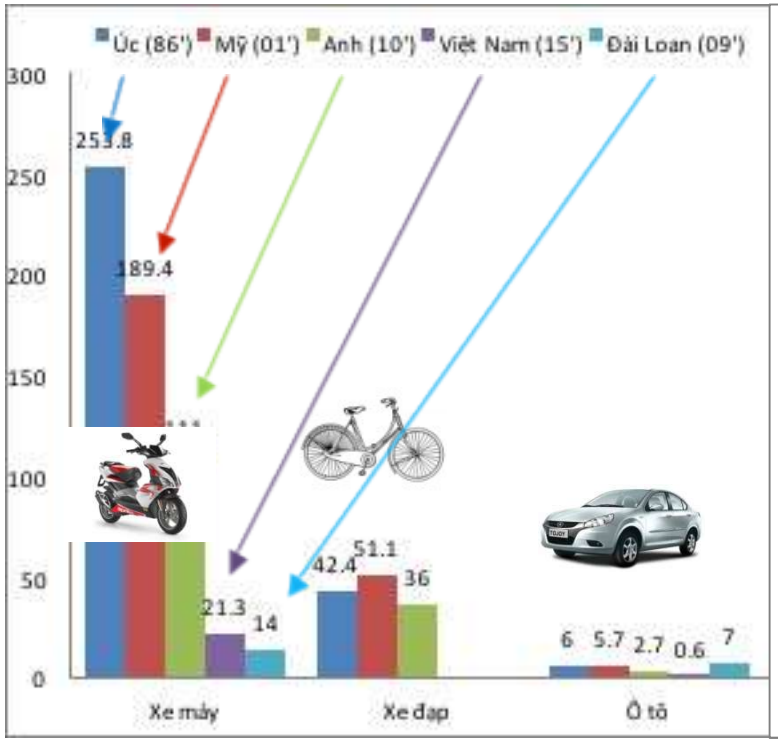
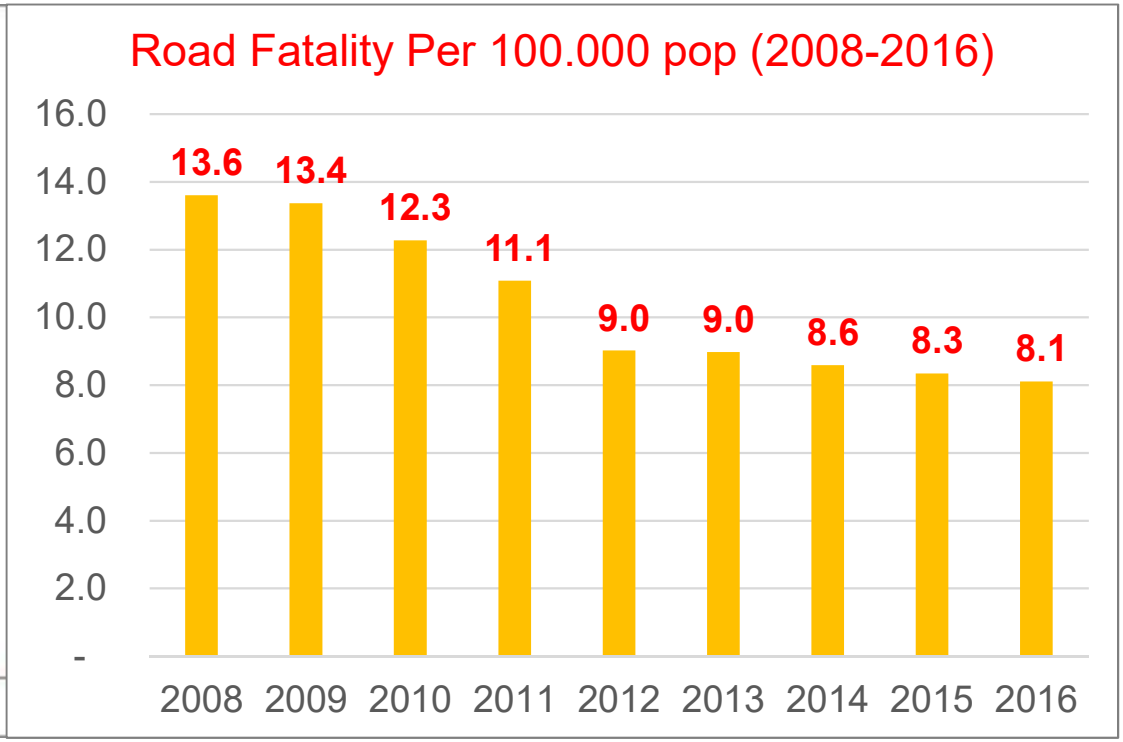
Current situation: Traffic accident

(death/billion pax-km)

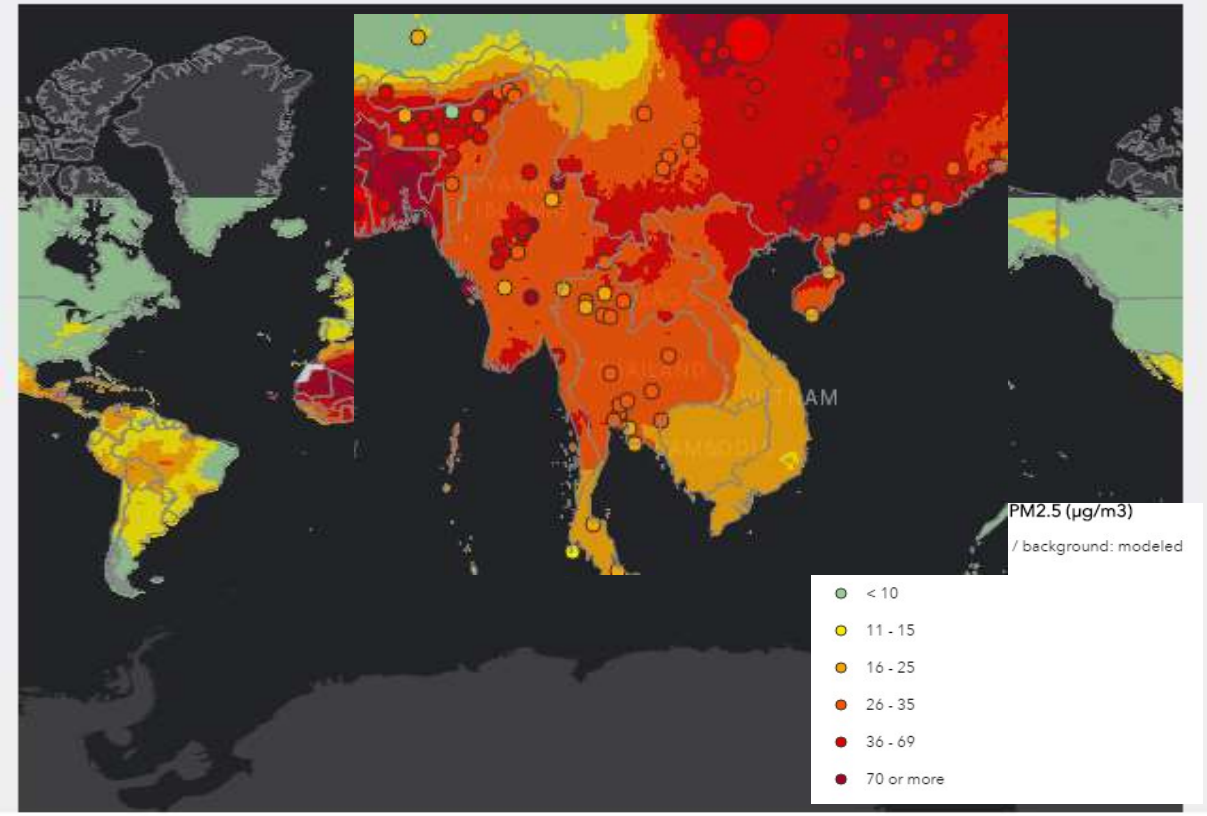


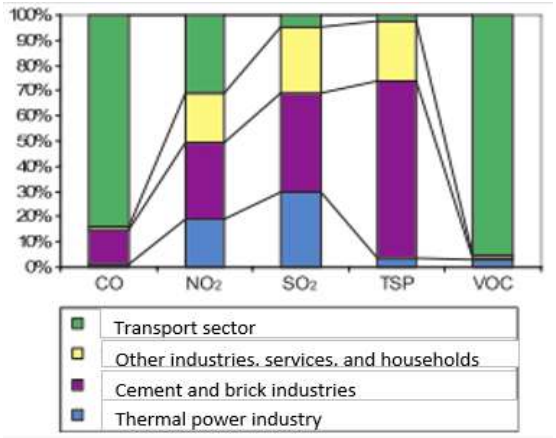


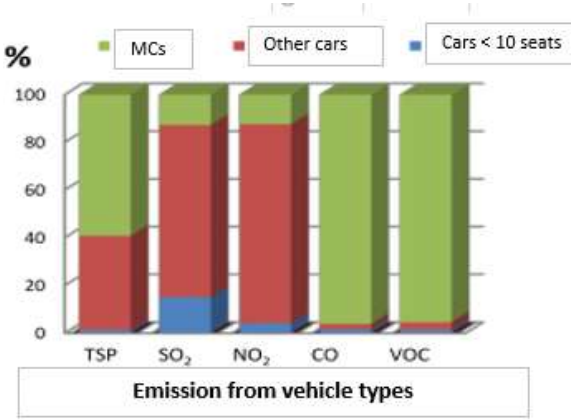
- MC riders take the highest fatal risk
- Aus., US, UK: MC > 500cc, high speeds/EXPW → higher death rates
- Taiwan: MC = 100-125cc, low speeds/cities → lower death rate
- Vietnam: MC fatal rate = 1.5 Taiwan

Current situation: Emission from transport

- The main air pollutants in VietNam are total suspended particles (TPS), PM10 (particles with diameter ≤ 10µm), O3, CO, SO2, NOx,… and noise (MONRE, 2013).
- Vietnam is located in the area where air quality levels exceed the WHO limits (WHO,2016).







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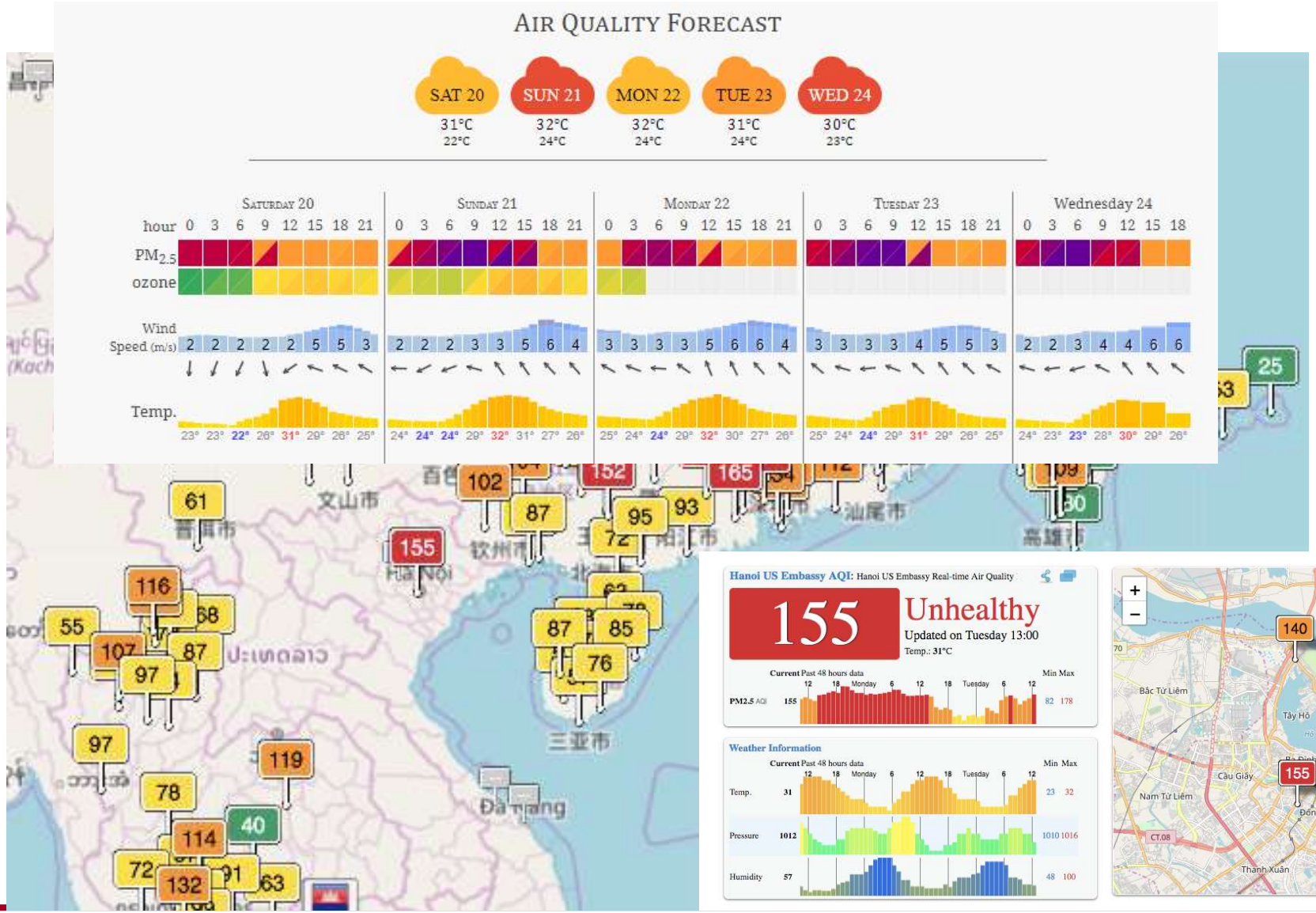
Current situation: Air Quality Index



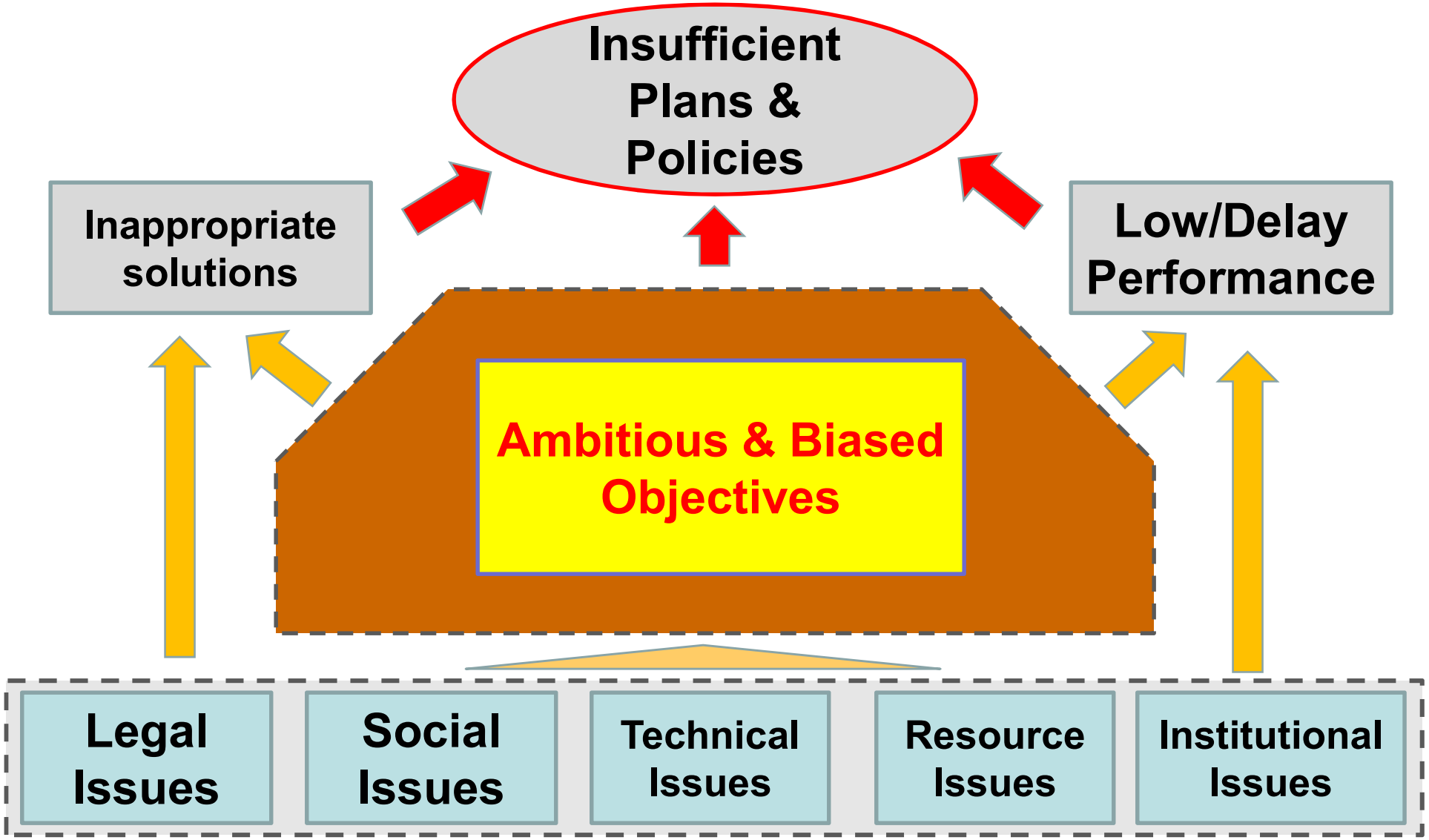
Causes of the Problems

- ***Internal Causes: Transport Issues***
  - ± **Demand:** high intensity and imbalanced distribution
  - – **Vehicles:** mixed vehicles on the traffic flow
  - – **Behaviours:** immature responses to motorisation of transport, without consideration to pedestrian,
  - – **Road Network:** imbalanced distribution, lack of hierachy, non-standard alleys
  - – **Parking**: lack of space and facilities, without consideration to MC
  - – **Public transport:** low availability and quality
  - – **Traffic Management:** confusing and low effectiveness
  - – **Urban and Transport Plans**: failed by
    - − Ambitious goals and objectives
    - ± Foreigner dependent planning
    - – Lack of resources (technical, financial, human)
    - – Complicated structure and low competency institutions

❑ *External Causes: Urban development Issues*

- **Political and socio-economic conditions**
  - ± Frequently changing laws and regulations, and institutional structure
  - ± Quickly increasing income
  - – Social conflicts between different income groups and cultural trends.
- **Demographic conditions**
  - – Rapid and uncontrolled urbanisation
  - ± High density population
- **Urban form and Land use conditions**
  - – Mono-centric urban form
  - ± Mixed land use in the city centre
  - – Sprawled and uncontrolled development in the newly urbanised areas
  - ± Two-wheeler accessed only block

Urban Master Plan: Issues & Problems



Urban Transport Management issues

- Low density urban development concept
- Extreme car-based or rail-based transport development concept
- Absence of travel demand management solution
- Absence of urban freight transport solution
- Absence of solution for motorcycle dependence
- Absence of solution for parking
- Absence of safety and environmental objectives

Low performance level

- **Institutional Performance**
  - Slow and irrational decisions
  - Ineffective institutional and official performance control evaluation system
  - Low competency's project management institutions
- **Operational performance**
  - Delay and mounting costs of projects
  - Hanging over projects
  - Ineffective quality control of projects
  - Low effective enforcement

Social and Legal Issues

Social Issues

- Large and increasing income gap
- Large and increasing opportunity and welfare gap
- Restoration and strengthening Extreme Familirism and Superstitions

Legal issues

- Lack of laws and regulations in master planning, implementation and operation
- Unclear and overlapping laws and regulations
- Solely segmented urban development planning structure (SEDP, UCMP, ULP, UTMP, UIP, UTP, UWSP, UWWTP, …)
- Top-down and Centralization in decision making process
- Unclear responsibility definition of institutions & positions

Technical, Resource and Institutional Issues

Technical Issues

- Architecture and Static Planning Concept
- Incomplete urban planning hierarchy
- Delay in time of constructing the master plan
- Lack of technical guidelines, standards, and tools
- Lack of qualified data

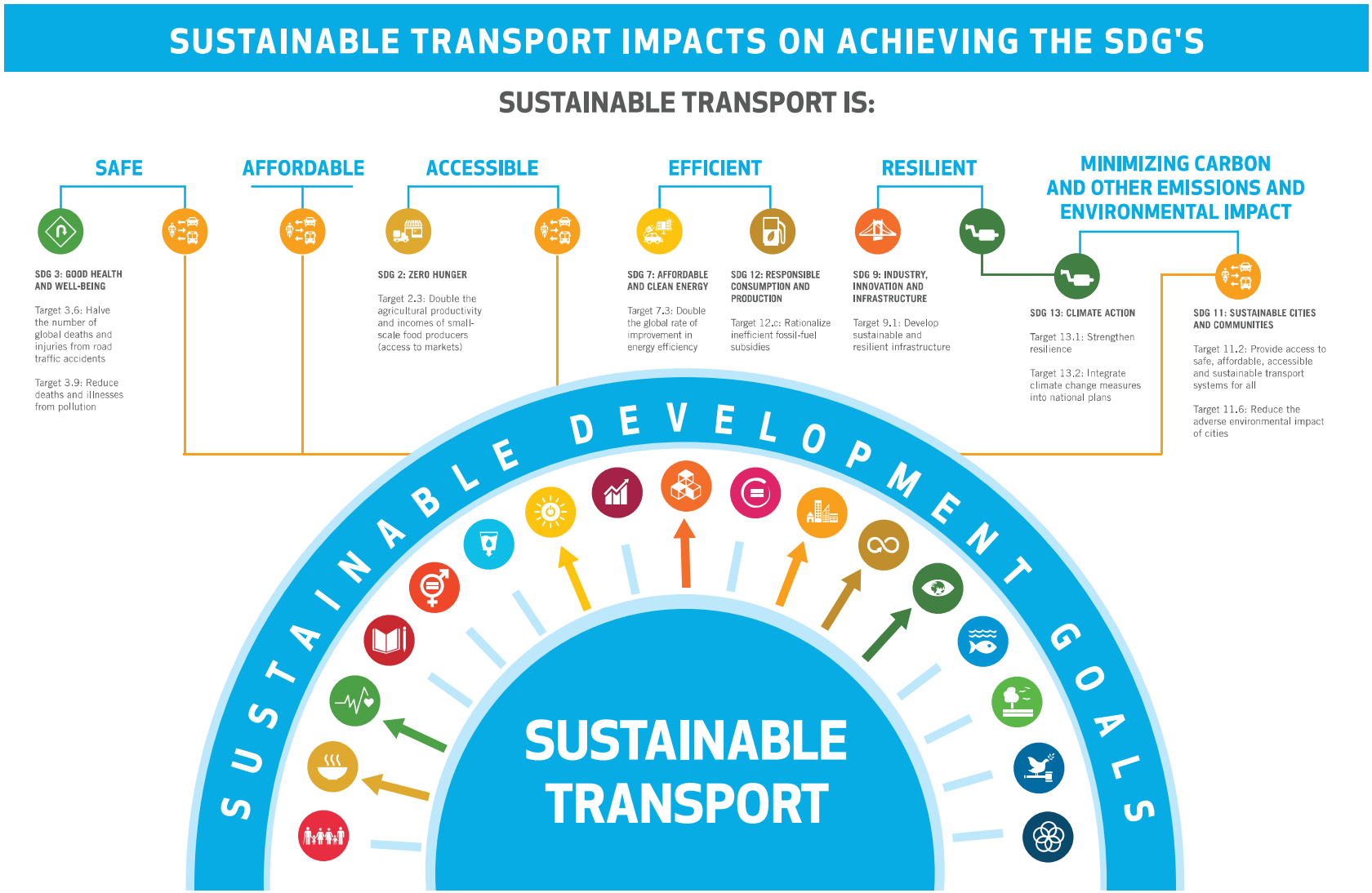
Resource Issues

- Lack of financial resource
- Lack of qualified human resource

Institutional issues

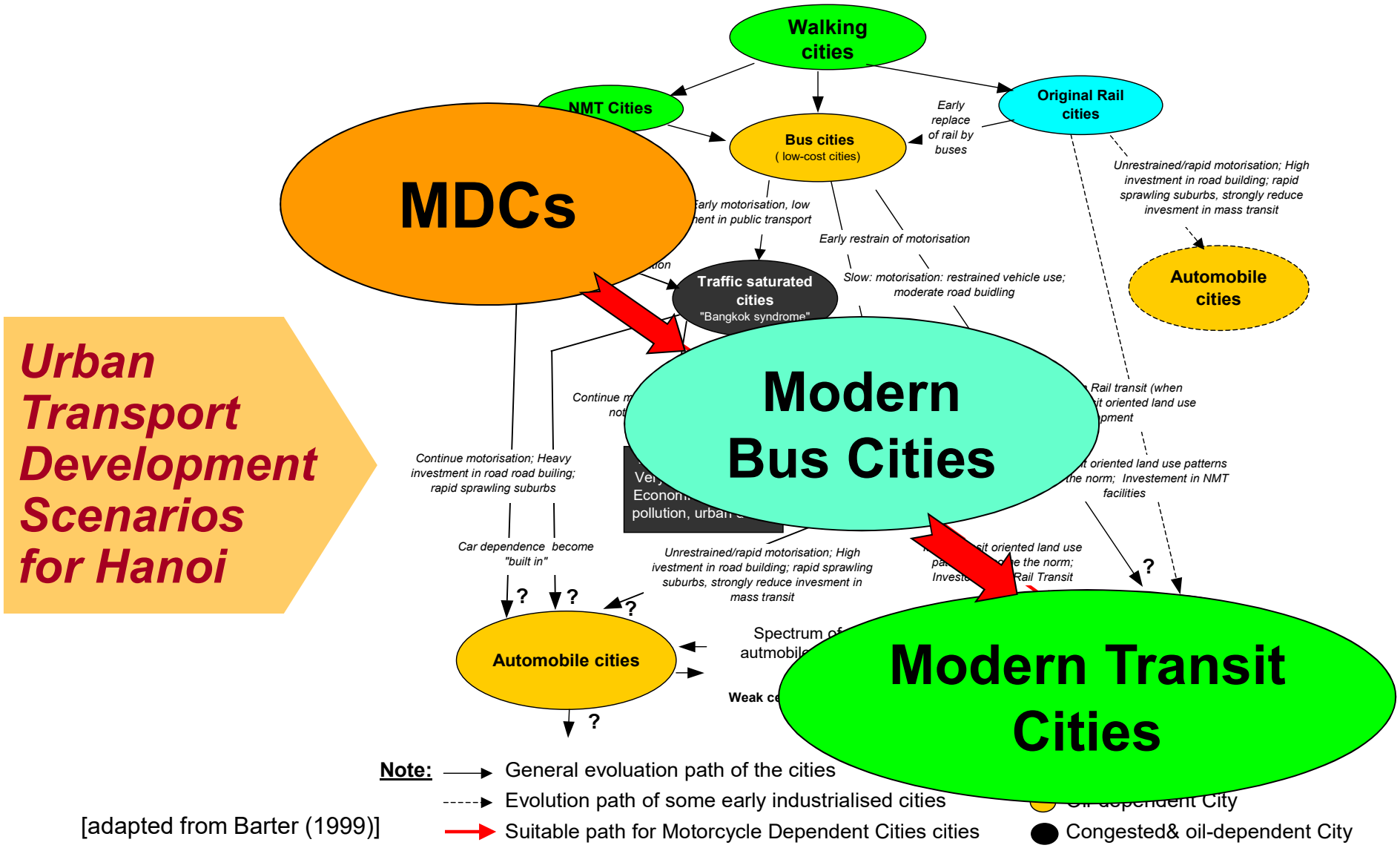
- Confusions between political and administrative functions
- Unclear functional and responsibility definitions
- Lack of cooperation and coordination

What do we want: A sustainable transport system



(Source: https://sustainabledevelopment.un.org/content/documents/2375Mobilizing%20Sustainable%20Transport.pdf)

Which way for urban and transport system in MDCs



[adapted from Barter (1999)]

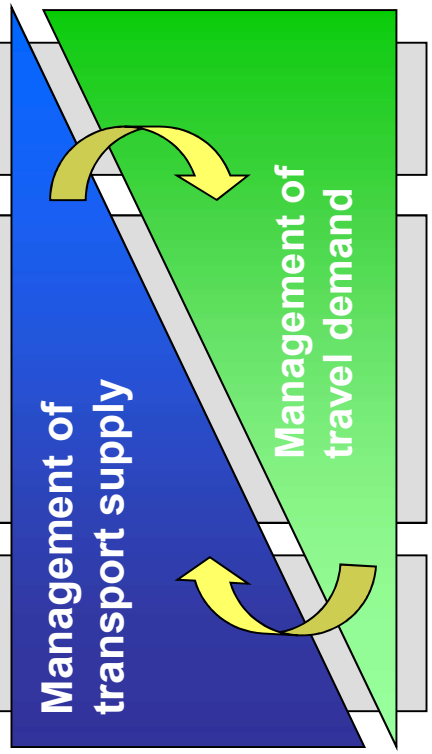
Traffic management

Traffic management is to influence transport supply and travel demand through a bundle of measures without having absolute new transport capacity, in order to optimise the positive and negative impacts of transport.

1. **Avoid traffic**

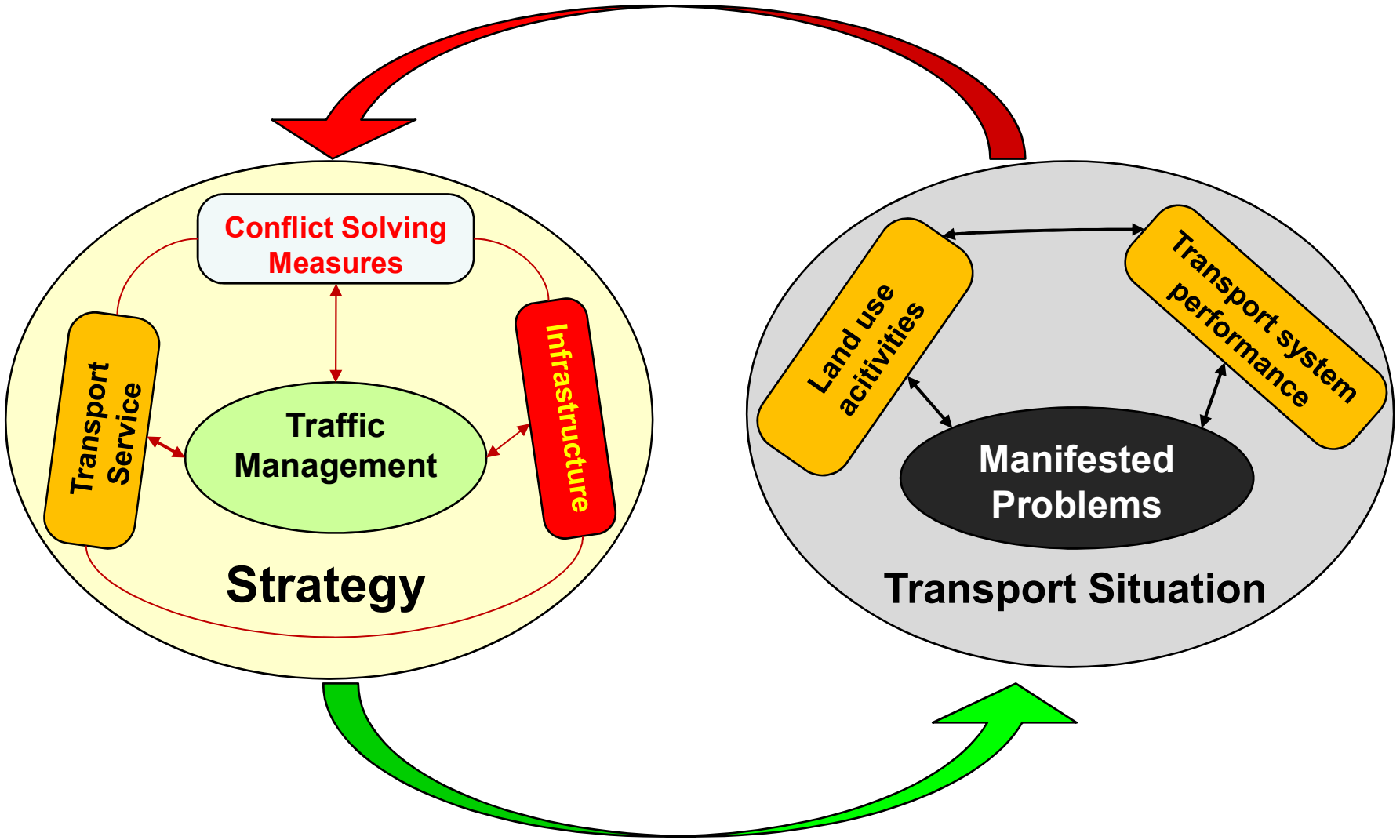
2. **Shift traffic**
   - **time**
   - **mode**
   - **space** (destination choice)

3. **Operate traffic**



[Apdapted from Boltze (2003]

Management-based Transport Development Strategies



[Source: Adapted from Khuat (2006)]

Comprehensive strategy for urban transport management

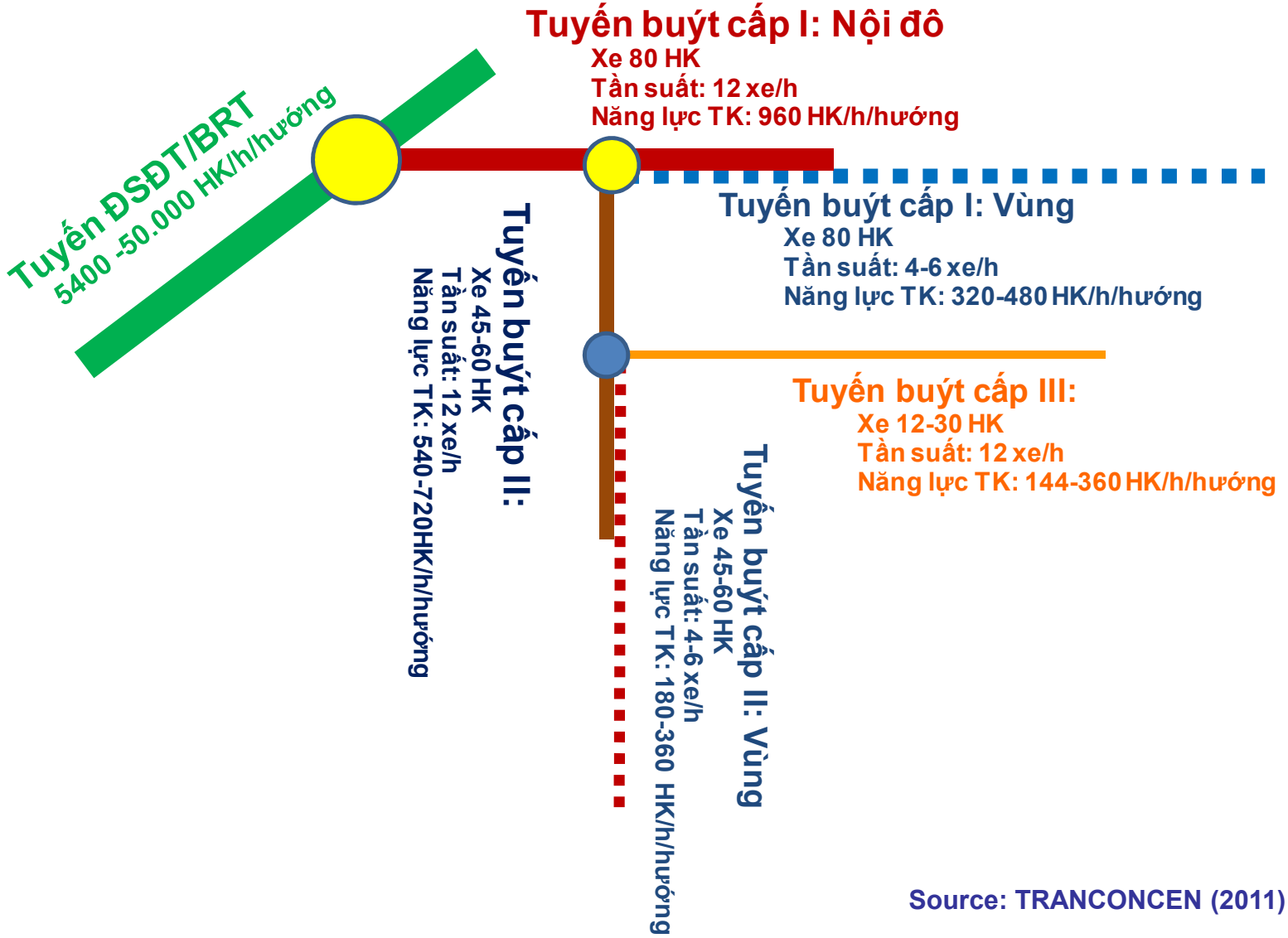
No.	Measure	Strategic Approach			Area of Application			
		General	*Modal*	*Unit*	*Con-urbation*	*City Centre*	*Arterial*	*Two-wheeler Block*
1	Public Transport Routing Improvement	Y	X	X	X	X	X	Y
2	Public Transport Scheduling Improvement	Y	X	X	X	X	X	
3	Public Transport User Incentives	Y	X	X	X	X	Y	
4	Public Transport Information Service	Y	X	X	X	X	X	Y
5	Public Transport Management Centre	Y	X		X			
6	Sidewalks and Crossing Facilities	Y	X	X	X	X	X	X
7	Non-motorised Transport Zone	X	X	X		X		X
8	NMT Traffic Information Service	Y	X	X	X	X	X	X
9	Vehicle Taxes and Duties for IMVs	X	X	X	X	X	X	
10	Vehicle Registration Control	Y	X		X	X		
11	Signalisation of Intersection Control	X	Y	X	X	X	X	
12	Traffic Calming and Speed Reduction	X	Y	X	X	X	X	X
13	Urban Traffic Information Service	X			X	X	Y	
14	Land Use Change	X		X	X	X	Y	X
15	City Logistic Management System Improvement	X	X		X	X	Y	X

Note

PT: Public Transport, NMT: Non-motorised transport, IMV: Individual motorised vehicle,

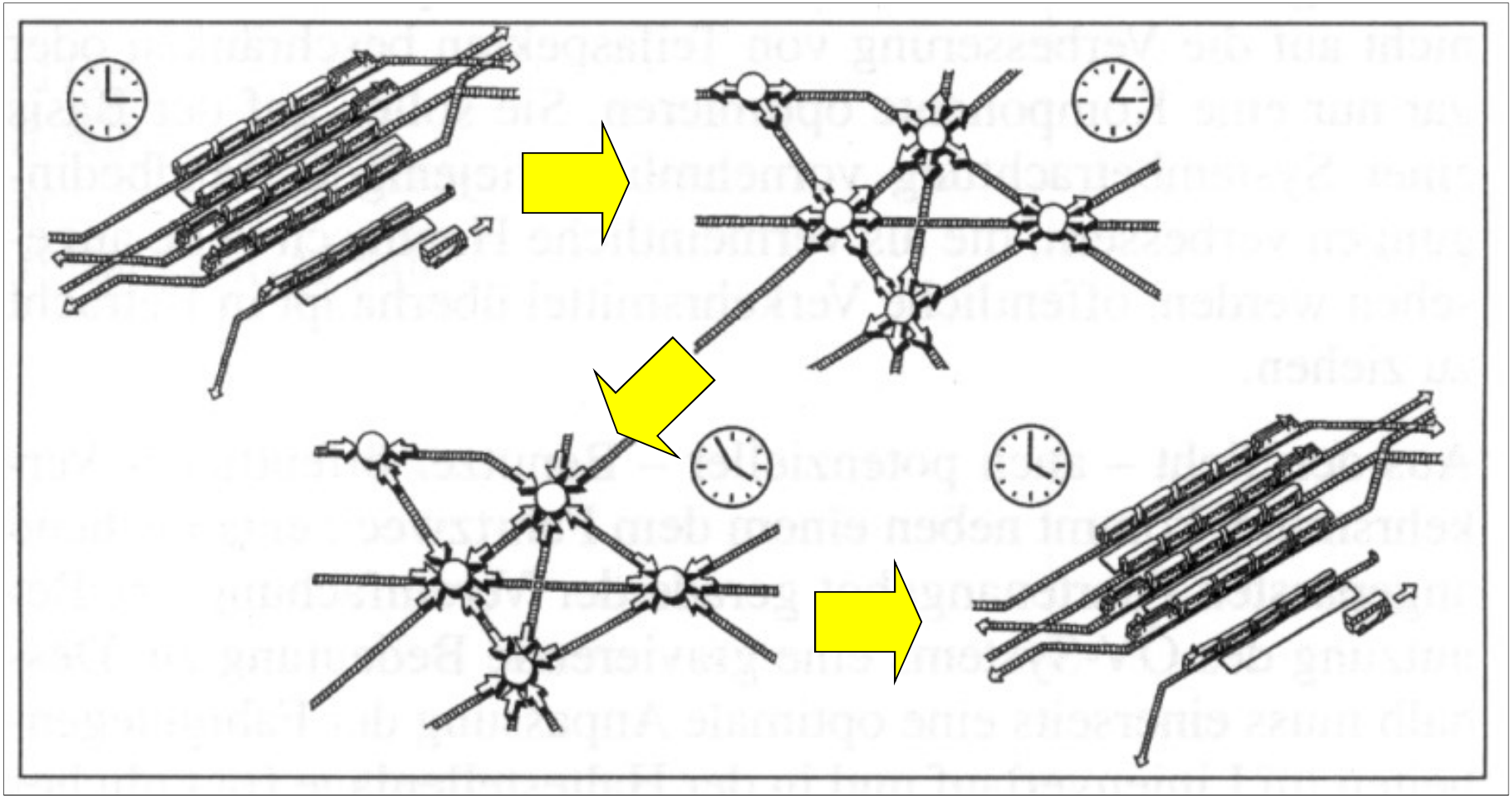
X: Fully applicable, Y: Partly applicable, Blank cell: Not applicable

Public transport routing improvement



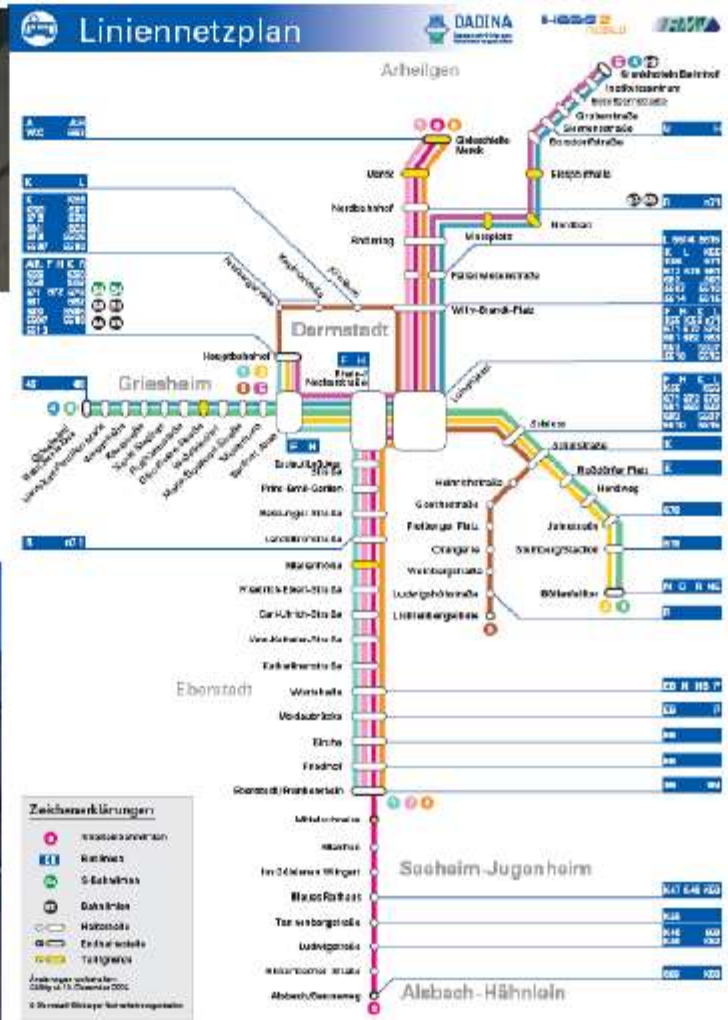
Source: TRANCONCEN (2011)

Public transport scheduling improvement



Nguồn: FGSV: Merkblatt zum Integralen Taktfahrplan. Köln 2001

Public transport information improvment



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Taxes and Duties for Individual Motorized Vehicles

Integrated Traffic Management Centre

Source: Straßenverkehrsamt Stadt Frankfurt am Main: IGLZ – Integrierte Gesamtverkehrs-Leitzentrale der Stadt Frankfurt am Main. 2006 / www.mainziel.de

Traffic Signal Control: Public Transport Priority

Urban Traffic Information: Regional Traffic Routing

Urban Traffic Information: Driver information

Urban Traffic Information: Intelligent Parking Management

Hamburg (1999)

Hannover (2000)

Infrastructure priority for NMT

http://www.nycbikemaps.com/

http://sf.streetsblog.org

http://afamily.vn/tam-su/20080917015338511/Nong-nan-mua-thu.chn

Traffic Calming Zone

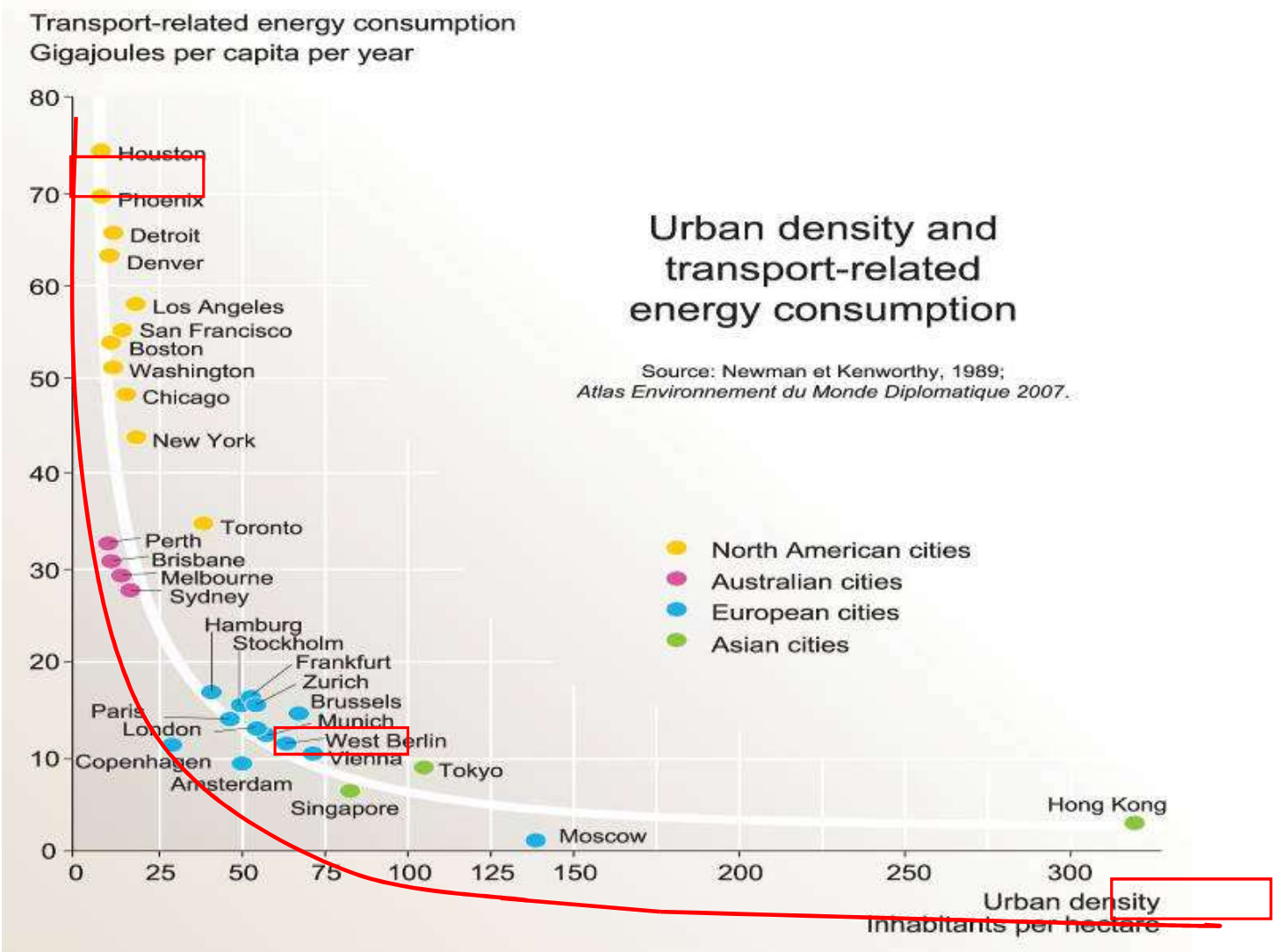
Sydney

Hà Nội

http://vnexpress.net/gl/the-gioi/australia-trong-toi/2011/04/mot-goc-sydney/

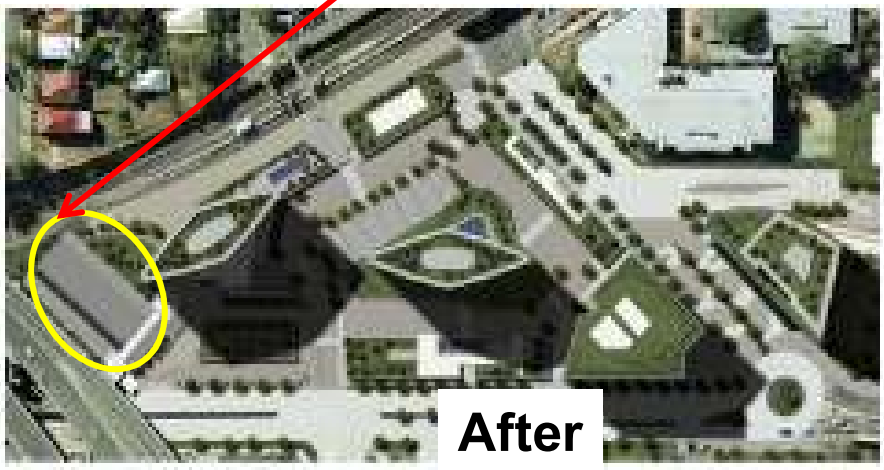
http://thethaovanhoa.vn/475N20111117085254343T0/ngo-nho-pho-nho.htm

Compact city concept and Land use change



Land use change based on MRT system

- Example: Buranda BRT Station (Queensland, Australia)
  - Plan and priority for changes
  - Project:
    - 2 Office & commercial building
    - 5 Residential High rise building
    - 1 Hotel
    - Open space



Conclusion

- Hanoi still strongly depends on motorcycle in term of accessibility and mobility
- Car use is growing and evidently causing both congestion and accidents
- Almost no chance to have balance car dependent situation
- Transit Oriented Development is a solution which may be the best but may not be the optimal solution within 10 to 15 years
- Cleaner and Safer Motorcycle usage in combination with bus transport improvement should be emphasized!!!
- Traffic Management must become key strategy in the urban transport development process

Recommendations

- Establishing a comprehensive macro Traffic Model to use as the basis for development plan and traffic management of the transport system
- Traffic Management Strategy must become major strategy in formulation and implementation of Urban Transport Master
- Conducting a comprehensive study on traffic management plan for the city in a period of 5 year with a vision to 10 year.
- Identifying the functions and responsibilities of related governmental authorities and agencies in traffic management.
- Recognizing urban traffic quality as one of the key performance indicators of the city development toward a sustainable vision
- Applying the Management-Based Transport Strategies in planning practice
- Strengthening capacity of institutions and human resources

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Thank you very much for your attention!